

## A Taxonomic Study of Nearctic *Meromyzobia* Ashmead, 1900 (Hymenoptera: Encyrtidae)

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**Abstract.**—The Nearctic species of *Meromyzobia* Ashmead, 1900, are reviewed. A generic diagnosis is provided and some important morphological characters are discussed. *Desantisella* Subba Rao is synonymized with *Meromyzobia* (New Synonymy). *Meromyzobia americana* Ashmead, based on a male, and *M. flavicincta* Ashmead, based on a female, are synonymized (New Synonymy), with *flavicincta* recognized as the valid name. A Lectotype is designated for *Ericydnus maculipennis* Ashmead, the type-species of *Meromyzobia*. Descriptive notes are given for *M. flavicincta*, *M. bifasciata*, and *M. maculipennis*. Four New Species are described (*M. deserticola*, *M. melanosoma*, *M. pedicelata*, and *M. texana*).

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### INTRODUCTION

The following taxonomic notes are part of a review of the Nearctic Encyrtidae and are published here in response to requests for identifications of material by several workers interested in ecological aspects of insects associated with salt marsh grasses (*Spartina* spp.) in Florida. I do not consider this a revision because fewer than 150 specimens are involved. Detailed phylogenetical notes on the relationship of *Meromyzobia* to other encyrtids will be published elsewhere (Gordh, in prep.).

*Meromyzobia* was characterized by Ashmead (1900) for a loosely described assemblage of species, most of which had been placed in other genera in earlier publications. Ashmead (1900) recognized six species in *Meromyzobia* from North America and these have been carried in subsequent catalogs without taxonomic study (Muesebeck et al., 1951; Peck, 1963; Gordh, 1979). Elsewhere, species referable to *Meromyzobia* have been taken only in South America. DeSantis (1968, 1972) has described *M. gripha* from a male taken near Buenos Aires, and *M. flavipes* from a female taken near Loreto (Misiones). DeSantis' (1979) Catalog of Neotropical Chalcidoidea (except Brazil) only includes these two species. Subba Rao (1971) described *Desantisella brasiliensis* from two females taken at Nova Teutonia, Brazil, and *D. plaumanni* from a male taken at the same locality. *Desantisella* is synonymized with *Meromyzobia* (New Synonymy). Explanation of this synonymy is given below. Otherwise, treatment of the South American species awaits collection of more material.

### *Meromyzobia* DIAGNOSIS

**Female.**—Body moderately large (usually 1.50–3.25 mm. long), sometimes elongate, sometimes robust. Coloration predominantly pale with weak to moderate metallic reflections over various parts of the body. Head hypognathous to

subopisthognathous; in dorsal aspect with anterior margin broadly rounded and continuous with compound eye margins laterad; vertexal margin broadly rounded, medial margins of compound eyes parallel, posterior margins not contiguous with posterior margin of head. Ocelli not close-set but centrally located on vertex; angle formed by anterior ocellus greater than 90 degrees; lateral ocellus about one diameter from medial margin of compound eye. Frontoververtex moderately wide, about 0.4–0.5 times as wide as head, weakly reticulate, sometimes shallowly and very sparsely punctate. Head in frontal aspect transversely oval with toruli closest, near ventral margin of compound eyes; scrobal impressions very shallow, short, and poorly developed; malar sulcus complete and well formed. Antennae with scape cylindrical in cross section or weakly compressed but not expanded ventrad; first two funicular segments anelliform, distal four funicular segments not modified; club not large or well differentiated, septa sometimes difficult to distinguish in point mounted specimens. Mandible with one tooth and a broad truncation or with three equal-sized teeth. Maxillary palpus four-segmented; labial palpus three-segmented.

Mesosoma with incomplete, short, straight parapsidal sutures; axillae meeting mesad; propodeum smooth, sloping posteriad and with two medial, longitudinal, subexocuticular carinae or lines of propodeal reinforcement. Wings macropterous, frequently conspicuously fuscous, females sometimes brachypterous. Middle tibial spur large, robust, and frequently enlarged distad.

Metasoma as large or larger than mesosoma; pygostyli near midline to apical one-third of metasoma, ovipositor and gonostyli usually not strongly exerted, sometimes exerted up to one-fifth length of metasoma. Seventh sternum from basal to apical one-third of metasoma.

*Male*.—Typically smaller than the female with antennal flagellar segments enlarged. Body coloration resembles female. Body parts similar in shape to female (including frontoververtex). Males macropterous with hyaline wings. Ocelli not larger than female ocelli.

#### DISCUSSION

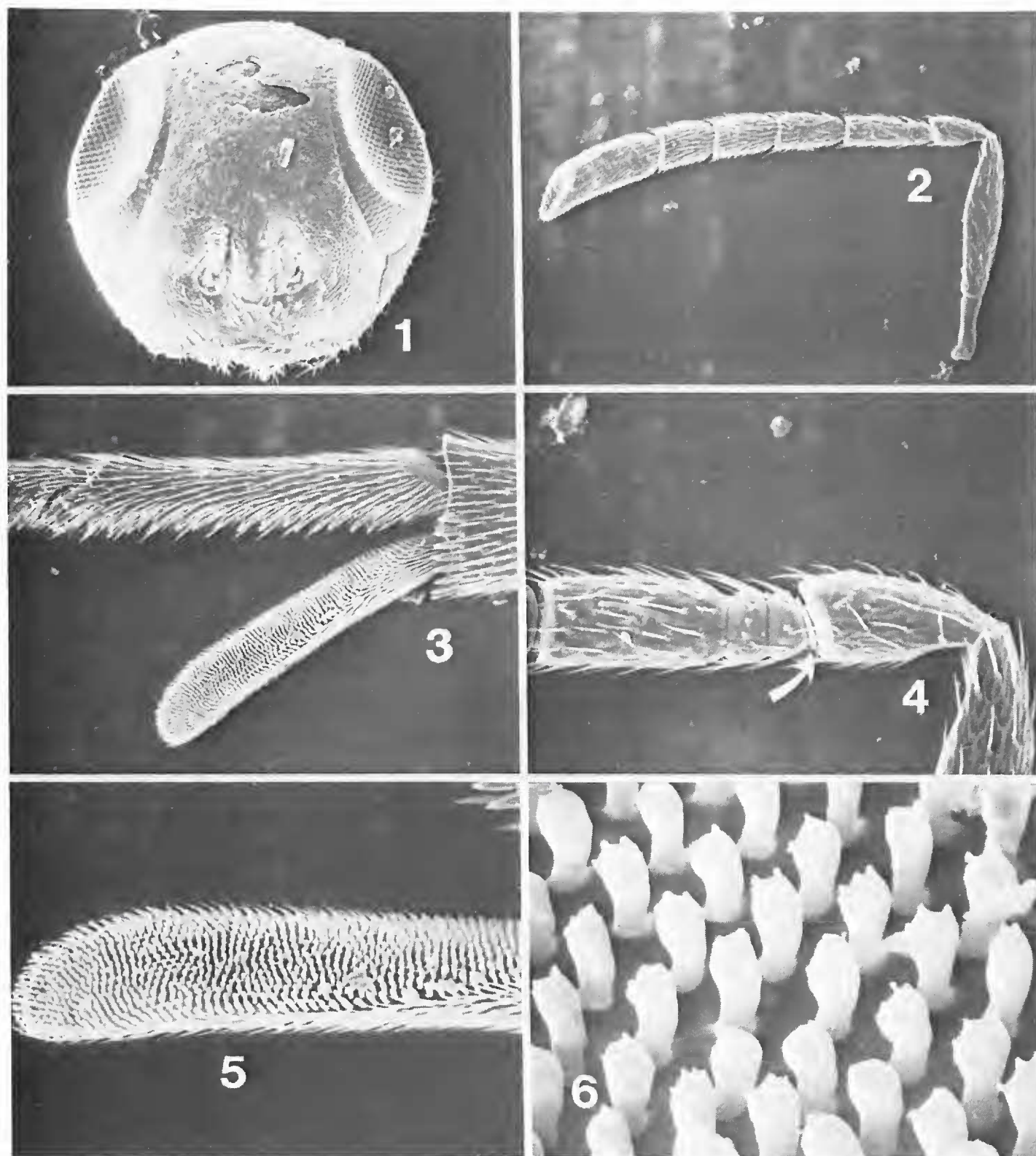
The correct systematic placement of *Meromyzobia* remains vague. Ashmead (1900) summarized early attempts at higher classification of the Encyrtidae and provided the modern concept upon which encyrtids were classified for more than 50 years. In his schema, *Meromyzobia* was assigned to the Ectromini, a Tribe characterized by species with bidentate mandibles, a large (frequently plowshare-shaped) seventh sternum, and a rather long marginal vein. *Meromyzobia* clearly does not possess the essential features of the Ectromini. Mercet (1921) abandoned the Tribal classification of Ashmead in favor of Subfamilies (the Encyrtinae and Arrhenophaginae with 12 “groups” in the former), but did not place *Meromyzobia* because it did not occur on the Iberian Peninsula. The genus was not treated by Erdos and Novicky (1955) for similar reasons. Hoffer (1955) provided a formal attempt at reorganizing encyrtid genera into Tribes. He did not consider *Meromyzobia*, but his reappraisal of the Mirini Ashmead has been shown to have merit and it is here that *Meromyzobia* belongs. Trjapitzin (1973A, B) reorganized the Encyrtidae and modified the concept of Subtribes within the group (corrected to Miraini). *Meromyzobia* was placed in the Subtribe Mayridiina by Trjapitzin and Gordh (1978), but was listed Incertae Sedis by Gordh (1979). Placement by Trjapitzin and Gordh is taken as correct pending further study.

I have not had the opportunity to study the holotype of *Desantisella brasiliensis* Subba Rao, which should be in the British Museum. However, the extensive description of that species and diagnosis by Subba Rao (1971) leave no doubt that *Desantisella* is synonymous with *Meromyzobia*. The shape of the middle tibial spur clearly fits within the concept of *Meromyzobia* as understood here. Other characters regarded as diagnostic for *Desantisella* are within the range of variation expressed by *Meromyzobia*.

Biologically, *Meromyzobia* appears diverse and does not fit the pattern of most Miraini which, according to Trjapitzin (1973B), are primary and secondary parasites of coccoids. Tachikawa (1978) reports *Meromyzobia* as parasitic on undetermined Orthoptera eggs. *Meromyzobia pedicelata* New Species was undoubtedly reared from Orthoptera eggs. The host plant was *Tripsacum laxum* Nash (Gramineae). *Meromyzobia melanosoma* New Species has been repeatedly taken in association with *Spartina* spp. (Gramineae) along the eastern seaboard of the United States. *Meromyzobia maculipennis* has been taken from the puparia of *Anthracophaga ingrata* (Williston), a chloropid. This fly was described from material taken by F. M. Webster, who also collected the parasite. The host plant for the chloropid was *Muhlenbergia mexicana* (L.) Trin. (Williston 1983). *Meromyzobia flavicincta* was taken from unidentified galls on *Aristida gyrans* Chapman (Gramineae). *Meromyzobia deserticola* New Species has been taken from *Hilaria rigida* (Thurb.) (Gramineae). *Meromyzobia texana* New Species has been reared in association with the pseudococcoid *Antonina graminis* (Maskell), an introduced pest of pasture, turf, and lawn grasses. Subba Rao (1971) does not mention the biology of *Desantisella*, but Noyes (1980) indicates its species are hyperparasites of Chamaemyiidae attacking Aclerididae. Thus, overwhelming circumstantial evidence suggests that *Meromyzobia* should be considered a New World genus of Miraini with an ecological preference for grasses.

Morphologically, *Meromyzobia* has several interesting features which may not be appreciated from the following taxonomic treatment, but which have importance in higher classification of this large and difficult group. Thus, sexual dimorphism should be studied carefully because it will prove helpful in understanding relationships. Most groups of encyrtids express dimorphism in antennal conformation, ocellar size and triangle shape, frontovertex size and shape, body size and coloration, and wing size and coloration. Species of *Meromyzobia* express very weak sexual dimorphism in head and antennal characters. The curious reduction of FI and FII of the antenna is a synapomorphy shared by males and females. Additionally, the vestigial ring segments are evident in several species (Figs. 4, 22, 35). Also of note is the lack of sexual dimorphism in ocellar size or arrangement.

*Meromyzobia* may be added to the number of genera in which mandible dentition is not constant. Most species are tridentate but the type-species and several others have one tooth and a broad truncation. The functional significance of this character and its character states must be considered before the character is considered of more than specific importance. I suspect that tooth shape and number is correlated with the context in which development occurs. The mandible shape of one tooth and a broad truncation is functionally adapted to facilitate the parasite emerging from galls. Gall wall architecture differs among plants but basically consists of a matrix of fibers. I hypothesize that the anterior, short, mandibular tooth grasps the gall fibers and loosens them from their position in the matrix. Subsequently, the conspicuous



Figures 1-6. 1. *Meromyzobia maculipennis*, female head, frontal aspect. 2. *M. maculipennis*, female antenna, lateral aspect. 3. *M. maculipennis*, female middle tibial spur and basitarsus. 4. *M. maculipennis*, female antennal pedicel, anellus (arrow), Funicular I-III. 5. *M. maculipennis*, female middle tibial spur, medial aspect. 6. *M. maculipennis*, female middle tibial spur setae on medial surface.

truncations (which form a broad line of contact when mandibles are opposed) engage the loose fibers which are then pulled free of the gall wall. A line of contact formed by the truncations is functionally more efficient for engaging the loose fibers than mandibular teeth in the form of conical projections. The line or truncated surface of contact is nearest to the liberated gall fibers and engages long and short fibers with equal facility. In comparison, conical mandibular teeth are less efficient because they contact gall material only near the apex of the teeth and therefore can engage short fibers over a limited portion of the potential surface area available for fiber engagement. A partial explanation for tridentate and truncate mandibles in

*Meromyzobia* may lie in host associations and the matrix being processed by the mandibles in emerging from pupal containment.

Parapsidal sutures are present in all species but constitute a plesiomorphous character. Female brachyptery is seen in more than one species but males of all species for which they are known are macropterous. The macropterous female wing is sometimes infumated, but the male wing is invariably hyaline. This dimorphism appears to be a plesiomorphy. In at least one species we see associated with the wing development a concomittant reorganization of thoracic sclerites consistent with a non-ecologically proximate wing reduction condition. (That is, wing reduction in encyrtids can be in response to at least two types of conditions. Environmentally induced brachyptery is a response to immediate conditions and seen in genera such as *Cheiloneurus* where individuals of a species may be macropterous or brachypterous depending on the time of the year, host, or both. Non-environmentally mandated brachyptery is manifested in species which undergo radical reorganization of thoracic sclerites to include elongation and enlargement of the pronotum at the expense of the mesoscutum and scutellum. The different conditions imply different levels of genetic control and complexity, and therefore should be evaluated as different characters, not character states.)

The middle tibial spur is perhaps the most important structural character used in defining *Meromyzobia*. Within the genus the character ranges from typically encyrtid to balloon-like and inflated distally. The extreme condition seems best expressed in South American forms. In North American *Meromyzobia*, the spur holds different forms of cuticular ornamentation. In all species examined, the outer surface appears pubescent. Light microscopy shows this pubescence as seta-like. However, SEM shows the pubescence is composed of trichode-shaped acanthae, not the characteristic trichogen-tormogen formation (Figs. 12, 13). In contrast, the medial surface of all species studied have the classic seta-in-a-socket (Fig. 37). The seta is modified in all species studied, but owing to the nature of the material examined (old) and its availability (borrowed and in limited numbers), a thorough study could not be made. Differences indicated under each species are taken as species specific. The setae range from short and rather straight (Fig. 6) to long and curved (Figs. 15, 31). Most species display a seta which is longitudinally depressed or spoon-shaped along one face (Figs. 6, 15, 31) with the apical surface tined (Figs. 6, 15, 31). At least one species displays setae which are hyphae-like and not spoon-shaped or apically tined (Fig. 37). In other respects, the morphology of *Meromyzobia* is not remarkable.

A KEY TO THE NEARCTIC SPECIES OF *Meromyzobia* ASHMEAD

- 1 (A). Males ..... 2
- (B). Females ..... 8
- 2 (A). Mandible with one tooth and a broad truncation; body robust; middle tibial spur distally lobate; scutellum elongate, nearly three times as long as median length of propodeum; subexocuticular propodeal carinae widely separated and parallel ..*Meromyzobia maculipennis* (Ashmead)
- (B). Mandible with three teeth or other characters variable or not in the combination above ..... 3

- 3 (A). Body not strongly dorsoventrally flattened and/or body predominantly pale colored or reddish brown ..... 4
- (B). Body rather conspicuously dorsoventrally flattened; body predominantly dark colored with some weak metallic reflections ... 5
- 4 (A). Parapsidal sutures transverse (Fig. 33), not oblique to primary axis of body; head viewed in dorsal aspect with posterior margins of compound eyes nearly contiguous with posterior margin of head at one point; propodeum pale ... *Meromyzobia texana* (New Species)
- (B). Parapsidal sutures not transverse (Fig. 8) oblique to primary axis of body; posterior margin of compound eyes separated from posterior margin of head by at least two ocellar diameters; propodeum reddish brown ..... *Meromyzobia flava* (Ashmead)
- 5 (A). Body large (ca. 3.5 mm); femora and tibiae all dark ... *Meromyzobia melanosoma* (New Species)
- (B). Body relatively small (ca. 2.5 mm); femora and tibiae not all dark .... 6
- 6 (A). Pronotum about as long as median length of mesoscutum; head subopisthognathous ..... *Meromyzobia deserticola* (New Species)
- (B). Pronotum shorter than median length of mesoscutum; head hypognathous ..... 7
- 7 (A). Frontoververtex  $< 0.50$  times as wide as head; with shallow setigerous punctures; body reddish brown ..... *Meromyzobia flavicincta* (Ashmead)
- (B). Frontoververtex  $> 0.50$  times as wide as head; without shallow setigerous punctures; body predominantly pale colored .. *Meromyzobia flava* (Ashmead)
- 8 (A). Metasoma in lateral aspect with gonostyli and ovipositor projecting well beyond apex of metasoma, at least 0.5 times length of middle tibial spur ..... 9
- (B). Metasoma in lateral aspect with gonostyli and ovipositor considerably shorter, not projecting conspicuously beyond apex of metasoma (Note: some distortion may give the impression of weak exertion, but gonostylus never as long as 0.5 times middle tibial spur length) . 10
- 9 (A). Metasoma slightly shorter than mesosoma; forewing with one fuscous spot posterior of marginal and stigmal veins; axilla yellow or pale colored; propodeum brownish with subexocuticular longitudinal carinae evident and parallel; mesopleuron pale ..... *Meromyzobia unifasciata* (Ashmead)
- (B). Metasoma clearly longer than mesosoma (Figs. 17, 18); forewing with two fuscous clouds separated by a hyaline stripe; propodeum nearly black or if somewhat more pale and subexocuticular carinae visible, then they diverge posteriad; mesopleuron dark brown or black .... *Meromyzobia melanosoma* (New Species)
- 10 (A). Mandible with one tooth and broad truncation; macropterous; subexocuticular propodeal carinae parallel or nearly so ..... 11
- (B). Mandible tridentate; macropterous or brachypterous; subcuticular propodeal carinae diverging posteriad ..... 13
- 11 (A). Pedicel elongate; propodeum with elevated median cuticular carina; pronotum less than 0.35 times medial length of mesoscutum ..... *Meromyzobia pedicellata* (New Species)

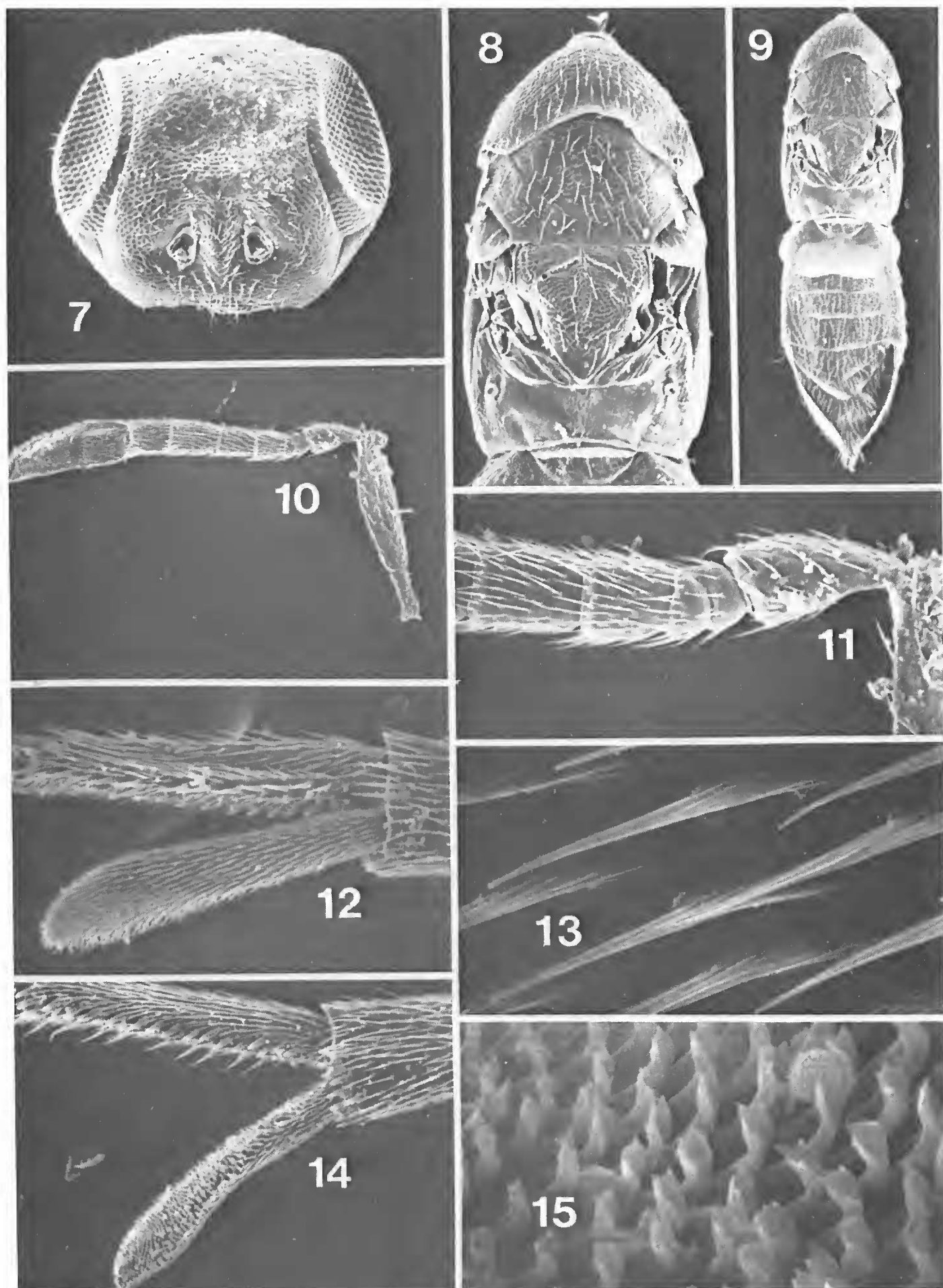
- (B). Pedicel normal; propodeum medially smooth, without carinae; pronotum at least 0.40 times as long as median length of mesoscutum 12
- 12 (A). Pronotum 0.5 times as long as medial length of mesoscutum; scutellum about 1.10 times longer than wide; frontoververtex 0.45 times as wide as head ..... *Meromyzobia bifasciata* (Ashmead)
- (B). Pronotum about 0.45 times medial length of mesoscutum; scutellum about 1.25 times longer than wide; frontoververtex 0.42 times as wide as head ..... *Meromyzobia maculipennis*
- 13 (A). Macropterous; forewing weakly infuscated beneath marginal vein; parapsidal sutures transverse (Fig. 33), not oblique to primary axis of body; propodeum with incomplete, weak, median longitudinal carina ..... *Meromyzobia texana* (New Species)
- (B). Brachypterous; forewing infuscation obscure; parapsidal sutures oblique to primary axis of body; propodeum medially polished and without longitudinal carina ..... 14
- 14 (A). Body predominantly pale colored; pronotal median length considerably longer than mesoscutum, but posterior margin transverse or nearly so, clearly not forming a broad, inverted “V”; mesosoma flattened; gonostyli concealed or not exerted ..... *Meromyzobia deserticola* (New Species)
- (B). Body predominantly dark reddish-brown; pronotal median length shorter than mesoscutum with posterior margin forming a very broad, inverted “V”; mesosoma not conspicuously flattened; gonostyli slightly exerted .... *Meromyzobia flavicineta* (Ashmead)

The following comments are included under names previously recognized as valid.  
*Meromyzobia americana* (Ashmead). 1888. Entomol. Amer. 41:16. Male.

This species was based on a male specimen taken in Florida. It has not been recovered or reported (except catalog entries) since its description. The original description is misleading because it states that the scutellum of the holotype is “large, highly convex and finely grooved.” In fact, the scutellum is of normal size for a male, not robust, and narrowly and longitudinally reticulate along postero-medial 0.60 with the pattern larger elsewhere; apex polished. Similarly, the pedicel is not unusually small, but rather the flagellar segments are disproportionately large. Otherwise, the description is accurate. Additional characters include: Frontoververtex 0.48 times as wide as head; surface reticulate with scattered, shallow, setigerous punctations. Middle tibial spur not enlarged distad. Propodeum with two distantly separated, longitudinal carinae.

Comparison of the holotype with the type of *M. flava* suggests that they are similar, although colored very differently. The specimens resemble one another in the shape of the head, configuration of the antenna, scrobal cavity, size and shape of the mesopleuron. Both bear a non-dilated middle tibial spur. The frontoververtex: headwidth ratio is 0.53 for *M. flava*, and scuteller sculpture patterns are different. Synonymy is not implemented here because too few specimens are available for study, and the holotypes are not in perfect condition for comparison.

I feel confident that the male described as *americana* is conspecific with the female described as *flavicincta* (New Synonymy). Both were taken from the same locality



Figures 7–15. 7. *M. flavicincta*, female head, frontal aspect. 8. *M. flavicincta*, female mesosoma (arrow to parapsidal suture). 9. *M. flavicincta*, female mesosoma and metasoma. 10. *M. flavicincta*, female antenna, lateral aspect. 11. *M. flavicincta*, female antennal pedicel, anellus, Funicular I–IV. 12. *M. flavicincta*, female middle tibial spur and basitarsus, lateral aspect. 13. *M. flavicincta*, female middle tibial spur acanthae. 14. *M. flavicincta*, female middle tibial spur, medial aspect. 15. *M. flavicincta*, female middle tibial spur setae on medial surface.

and described in the same publication. The dimorphism expressed in this species is identical to that found in *M. deserticola* New Species, including female aptery and male macroptery. As first revisor, I select *Meromyzobia flavicincta* as the valid name because the type is based on the female sex and I regard this sex as more important in encyrtid classification.

*Meromyzobia bifasciata* (Ashmead). 1890. Bul. Colo. Biol. Assoc. 1:28,46. Female.

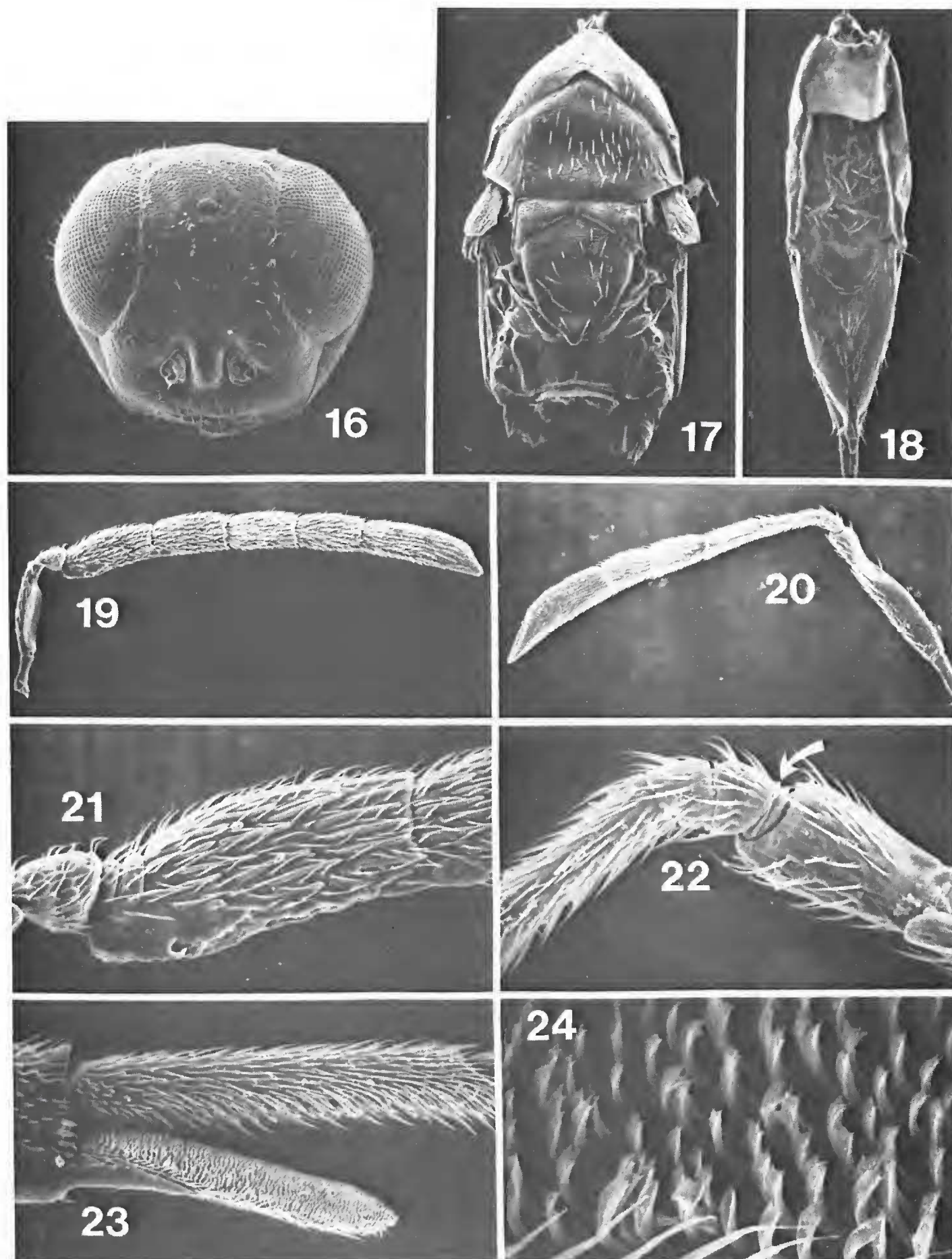
This species was based on one female taken at West Mountain Valley, Colorado, by T. D. A. Cockerell and originally placed in *Homalotylus*. The point-mounted holotype stands in the USNM collection (Type-number 4720), and lacks the club of one antenna and all flagellar segments of the other antenna. The description was based primarily on coloration, the precise nature of which cannot now be confirmed. Two points in error are corrected here; the body length is 2.32 mm, not 2.20 as indicated by Ashmead, and the frontovertex is not closely punctate with a few larger punctures but rather minutely reticulate with scattered, shallow, setigerous punctures. Characters here considered important, but not included in the original description include: frontovertex 0.45 times as wide as head, mesosoma robust, pronotum 0.5 times as long as medial length of mesoscutum, posterior margin forming broad, inverted “V”; scutellum about 1.10 times wider than long, posterior 0.30 polished and flattened. Forewing macropterous with extensive infuscation. Middle tibial spur lobate distad. Metasoma with gonostyli and ovipositor very slightly exserted, pygostyli and posterior margin of seventh sternum near midline of metasoma.

I am not convinced that *bifasciata* is distinct from *maculipennis* as I can find no reliable structural characters to differentiate them. The former is represented in the USNM collection by the holotype only; the latter is represented by the “type” and fewer than ten specimens identified by earlier workers. This material is in poor condition and many characters are difficult to observe or measure. They are probably synonyms, but synonymizing them seems more appropriate when more and better curated material is available for study. Characters used to separate females in the key may be an artifact of small sample size and poor preservation.

*Meromyzobia deserticola*, New Species

*Female*.—1.86 mm long. Body predominantly pale yellow with following parts darker: posterior  $\frac{2}{3}$  of mesopleuron, lateral  $\frac{3}{4}$  propodeum, metasomal terga IV–V reddish brown. Antennal scape concolorous with head, remaining segments uniformly darker. Basal  $\frac{2}{3}$  tegula white, remainder dusky, prepectus nearly transparent. Fore and hind coxae yellow, hind coxa with vestiture of conspicuous white setae. Middle coxa dusky; pretarsi dusky. Hind femur reddish brown, basal  $\frac{1}{5}$  tibia white, remainder reddish brown; pretarsi dusky, remaining tarsomeres nearly white. Wings hyaline.

Head subopisthognathous, in dorsal aspect with frontovertex 0.46 times as wide as head, 0.75 times as long as head. Ocelli small, forming a very broad, obtuse triangle with lateral ocellus about one diameter from medial margin of compound eye. Posterior margin of head very broadly rounded; head in frontal aspect 1.27 times wider than long; vertex weakly arched above imaginary line continuous between lateral margins of compound eyes. Ventral margin of head broadly arched. Head in lateral aspect 1.7 times longer than wide. Compound eye with minute setae,



Figures 16–24. 16. *M. melanosoma* NEW SPECIES. Female head, frontal aspect. 17. *M. melanosoma*, female mesosoma. 18. *M. melanosoma*, female metasoma. 19. *M. melanosoma*, male antenna, medial aspect. 20. *M. melanosoma*, female antenna, medial aspect. 21. *M. melanosoma*, male antennal pedicel, Funicular I–III. 22. *M. melanosoma*, female antennal pedicel, anellus (arrow), Funicular I–III. 23. *M. melanosoma*, female middle tibial spur and basitarsus, medial aspect. 24. *M. melanosoma*, middle tibial spur setae on medial surface.

posterior margin of eye diverging from posterior margin of head ventrad. Malar sulcus complete and conspicuous. Entire surface of head minutely reticulate with moderate vestiture of pale, short setae. Antenna as illustrated (Fig. 39). Mandible tridentate.

Thoracic notum flattened. Pronotum campanulate, as wide as long; mesoscutum 0.5 times as long as pronotum, 0.83 times as long as scutellum. Parapsidal sutures difficult to discern, but short, straight, oblique to primary axis of body and subparallel to lateral margin of mesoscutum. Propodeum 0.65 times as long as scutellum, median portion with two subparallel, subsurface carinae which diverge posteriad. Mesopleuron smooth, 2.82 times longer than wide. Middle tibial spur enlarged but apically tapered, not pointed. Wings micropterous.

Metasoma 1.15 times as long as mesosoma; pygostyli at apical 0.64 of metasoma. Ovipositor and gonostyli not exerted; gonostyli broad and apically rounded. Seventh sternum at basal 0.33 of metasoma; posterior margin medially incised. Tergum I as long as following three terga combined, reticulate; sculptural pattern less pronounced on terga II–VII; all terga with moderate vestiture of conspicuous pale setae.

*Male*. — 1.44 mm long. Habitus as female, differing in that posterior aspect of head reddish brown, anterior aspect more pale; axillae black, remainder of mesosoma and metasoma reddish brown. Antenna concolorous with forecoxa; hind femur dusky; fore and middle femora and tibiae yellow; basal half of hind tibia nearly white; apical half nearly yellow. Tarsomeres 1–3 white, tarsomere 4, pretarsi dusky. Wings hyaline, macropterous. Ocelli larger than female. Antenna as illustrated (Fig. 38). Wings macropterous (Fig. 40), projecting beyond apex of metasoma. Thoracic notal sculpture not as bold as female.

Described from six females and three males taken at Seeley, CA, 25 March 1965 on *Hilaria rigida* (Thurb.) (Gramineae) by R. A. Flock and J. Pineda. Holotype female, allotype male, and paratypes deposited in USNM collection.

*Meromyzobia deserticola* most nearly resembles *M. flavicincta* and may be distinguished from that and other species based on characters given in the key.

*Meromyzobia flava* Ashmead, 1900. Proc. U.S. Natl. Mus. 22:350. Male.

According to the original description and USNM type-catalog, this species was based on a male taken in the District of Columbia. It has not been recovered elsewhere or at a later time. The holotype is point mounted and stands in the USNM collection (Type-number 4723) and bears a label reading "Arlington, VA." The original description is not particularly accurate or informative. Study of the specimen shows that it is morphologically similar to *M. americana*. Characters incorrect or not included in the original description include body length 1.46 mm, head yellow with three darker spots each anterior of an ocellus, forewing slightly infuscated beneath marginal vein. Frontoververtex 0.53 times as wide as head, without scattered setigerous punctures.

*Meromyzobia flavicincta* (Ashmead), 1888. Entomol. Amer. 4:17. Female.

This species was described from one female taken at Jacksonville, Florida. The intact holotype is mounted on a card and deposited in the USNM collection. The brief description is not particularly informative or accurate and descriptive notes are provided here. The specimen is 1.90 mm long (0.75 in, not 0.80 as stated in the

original description). The coloration is not as the description but the life-like color cannot be accurately given owing to the age of the specimen. Based on a specimen I identify as *M. flavicincta*, the head, pronotum, and mesoscutum appear tan, antenna somewhat darker; axilla, scutellum, propodeum, mesopleuron dark reddish brown; metasoma predominantly dark with pale yellow with transverse band near base. Coxae, tibia, femora dusky; tarsomeres white, pretarsus dusky.

Head as shown (Fig. 7); antenna (Figs. 10, 11) not particularly short or slender. Frontovortex 0.48 times as wide as head, reticulate with several shallow setigerous punctures. Pronotum 0.75 times as long as medial length of mesoscutum; posterior margin forming broad, inverted "V." Parapsidal sutures distinct, but incomplete (Fig. 8). Wings brachypterous but projecting slightly beyond posterior margin of propodeum; distal margin of wing weakly infuscated. Propodeum with subcuticular carinae diverging posteriad. Middle spur distally lobate. Ovipositor and gonostyli very slightly exserted beyond apex of metasoma (Fig. 9). Mesopleuron 1.66 times longer than wide; surface very weakly reticulate. Middle tibial spur (Figs. 12–15) enlarged distad; pubescence on outer surface composed of elongate acanthae (Figs. 12, 13); medial-surface setae long, curved, apically tined (Figs. 14, 15).

Although the female is brachypterous, I consider it conspecific with the male described by Ashmead as *Prionomastix americana* as noted above. The shape of the head in male and female is similar and the relative length of the pronotum to the other components of the thorax are identical. The propodeum is the same size, shape, and has two subcuticular, longitudinal carinae which diverge posteriad. The middle tibial spur in both sexes is large, robust, but apically pointed in the male and enlarged in the female. The parapsidal sutures are similarly developed in the male and female. Both specimens were taken at Jacksonville, Florida, probably about the same time as judged from the identically printed locality labels and curiously constructed microscopic card mounts. Neither specimen pin carries supplemental collection information. The USNM type-catalog number 4721 indicates that specimen came from the Ashmead collection and was taken from Florida. Type-catalog number 4719 carries the entry for *americana*. It also reports that specimen is from the Ashmead collection, taken from Florida without a specified locality, and erroneously logs the sex of the specimen as a male. Nevertheless, the synonymy proposed here is taken as correct and the male is nearly identical with the male described as *flava*, but synonymy is not implemented. Five female specimens taken at Miami, Florida, from gall on *Aristida gyrans* also stood in the USNM collection appear conspecific with the holotype.

*Meromyzobia maculipennis* (Ashmead), 1893. Bul. Ohio Agr. Exp. Sta., Tech. Ser. 1:162–163.

Understanding the concept of this species is important for several reasons. Originally described by Ashmead as *Ericydnus maculipennis*, it was based on several specimens which Ashmead considered as males. The type-series was of indeterminate size and reared from *Chlorops ingratus* Williston (= *Anthracophaga ingrata*) by F. M. Webster in Ohio. A holotype was not designated. In the USNM collection is one specimen in the type-collection with labels which read: "Columbus O," "F. M. Webster," "Type 4722 USNM" and "*Ericydnus maculipennis* Ashm." The last label carries the word "Ashm." twice and a male symbol which has been replaced with a female symbol. This label is in Ashmead's handwriting whereas the

other three labels are typeset. The specimen on the pin is a male. Four other specimens in the collection carry handwritten labels "5272° Par: on *Chlorops*." At least two of these specimens are females. The number on the latter three pins is a Webster Number, but that card entry is missing from the Webster Number Catalog in the USNM. The USNM type catalog entry indicates that three specimens were received from Webster, which with published information and information on the collection labels suggests that the card mounts with the handwritten labels are part of the type-series used by Ashmead to describe the species. Study of all four specimens shows them to be conspecific. To complicate matters a microscope slide with fragments is labeled "*Meromyzobia maculipennis* Ashmead ♂ ♀ types" in the handwriting of A. A. Girault. Under the circumstances the specimen in the type-collection has been remounted on a larger card (owing to its precarious position) with a leg and forewing remaining on the original point. It has been labeled LECTOTYPE. The remaining specimens have been labeled as *Meromyzobia maculipennis*, but not designated paralectotypes.

The original description of *maculipennis* is misleading in many respects. Specimens range in size from 2.30–2.65 mm in length, not 3.0–3.1 as reported by Ashmead. Antennal segments (Figs. 2, 4) are not subfiliform as noted in the original description, but rather females bear the characteristic two anelliform funicular segments and the male apparently does as well, although this cannot be confirmed from the specimens available for study. Other characters not mentioned by Ashmead in the original description, but important in recognizing this species include: mandible with one tooth and a broad truncation; head (Fig. 1) with frontovertex 0.42 times as wide as head, reticulate with a few scattered, shallow, setigerous punctures. Pronotum 0.43 times as long as medial length of scutellum; posterior margin forming a broad, inverted "V" of an angle more than 90 degrees. Scutellum 1.25 times longer than wide, predominantly reticulate with apical 0.30 polished and flattened. Middle tibial spur (Figs. 3, 5, 6) large with setae on medial surface short, straight, apically tined. Ovipositor and gonostyli not exerted or very slightly exerted (due to distortion of metasoma after death). Stylus less than half as long as middle tibial spur. Pygostyli and posterior margin of seventh sternum near an imaginary transverse line bisecting metasoma.

Subba Rao (1971) apparently had not seen *Meromyzobia maculipennis* when he characterized *Desantisella*. This genus was proposed for two South American species, *brasilensis* and *plaumanni*. *Desantisella* is coincident with *Meromyzobia* in all salient features, including head shape, antennal configuration, wing coloration, shape, and venation, and size of the middle tibial spur. Other characters, including the three toothed mandible, fall within the scope of variation expressed for other species included in the genus. *Desantisella* here is recognized as a junior synonym of *Meromyzobia* (New Synonymy).

#### ***Meromyzobia melanosoma*, NEW SPECIES**

*Female*.—3.72 mm long. Body elongate (Figs. 17, 18) macropterous with wing projecting near apex of metasoma but not beyond distal portion of gonostyli. Body predominantly dark brown to black. Head reddish brown, pronotum dusky; anteromedial portion of mesoscutum dark brown, remainder yellow; anterior half of tegula yellow, posterior half dusky; axillae, scutellum, propodeum black; mesopleuron dark brown; metasomal tergum I anterolaterally dusky, remainder

weakly yellow; remainder of metasoma brown; gonostyli contrastingly pale brown. Antenna somewhat darker than head. Forewing predominantly fuscous with clouds over wing blade. Coxae, femora, tibiae concolorous with mesopleuron; fore tarsomeres brown; middle tibial spur, tarsomeres 1–3 of middle and hind leg white; tarsomere 4 and pretarsus of middle and hind leg dusky.

Head hypoganthous, in dorsal aspect with frontovertex 0.42 times as wide as head and 0.85 times medial head length; frontovertex minutely reticulate, setigerous punctures very shallow and sparse, nearly absent. Ocelli forming a large triangle whose anterior angle exceeds 90 degrees; lateral ocellus less than one diameter from medial margin of compound eye, about four diameters from occipital margin. Occipital margin broadly rounded. Head in lateral aspect about 0.51 times taller than wide; malar sulcus conspicuous and complete; compound eye with scattered minute setae, posterior margin diverging from posterior margin of head ventrad. Head in frontal aspect (Fig. 16) 1.06 wider than long, with toruli close-set, separated by less than torular width; interantennal prominence weak and broadly rounded; scrobal impression weakly developed, nearly absent (Fig. 16). Mandible tridentate. Maxillary palpus four-segmented; labial palpus three segmented. Antenna as illustrated (Figs. 20, 22).

Mesosoma rather elongate (Fig. 17) but shorter than metasoma (Fig. 18). Pronotum weakly, minutely reticulate; with moderate vestiture of darkened setae; medial length 0.31 times as long as medial length of mesoscutum; posterior margin forming an angle of about 110 degrees. Mesoscutum with reticulate polygonal sculptural pattern somewhat larger than pronotal pattern but similar vestiture of setae; parapsidal sutures incomplete but converging posteriad. Axillae reticulate, broadly joined mesad; mesoscutellum 1.22 times longer than wide, predominantly reticulate with apex polished; mesopleuron 2.13 times longer than wide; predominantly reticulate but pattern minutely and longitudinal reticulate anteriad and expanding in size and diminishing in boldness posteriad; posterodorsal margin polished. Coxae with conspicuous vestiture of long pale setae on the ventral-facing surface. Middle tibial spur shorter than basitarsus (Fig. 23) with rather long, curved, apically tined and compressed setae along medial surface (Fig. 24).

Metasoma lanceolate (Fig. 18), 1.60 times longer than mesosoma. Terga weakly reticulate. Syntergum apically pointed and projecting over base of gonostyli. Gonostyli slightly shorter than middle tibial spur (0.92), apically broadly rounded. Pygostyli near midline of metasoma. Apical sternum terminating near basal third of metasoma.

*Male*.—2.32 mm long. Similar to female habitus, coloration, and sculpture; differing in the following features: frontovertex 0.28 times as wide as head; 0.92 times as head medial width. Antenna as illustrated (Figs. 19, 21).

*Material Examined*.—Holotype, Female. FLORIDA, Levy Co., 1 Female 16.iii.75; 1 FE 30.iii.75; 1 male, 1 female 25.iv.1975; 1 male 13.iv.1975; 1 female 23.xi.1975; 2 females, 2 males 9.xi.1975; 8 females, 1 male 7.xii.1975; 4 females, 1 male 11.i.1976; 1 female, 1 male 8.ii.1976; 2 males 16.ii.1976, all specimens taken on *Spartina alterniflora* Lois. (E. E. Grissell). GEORGIA, Sapela Island: 1 female 17.v.1963 (E. P. Odum), 1 female, 3 males on *Spartina* (H. Kale), 3 males 9.x.1963 on *Spartina* (E. P. Odum), on *Spartina*. NORTH CAROLINA, Cartaret Co., Newport R., 1 female 14.xi.1959 (L. V. Davis) on *Spartina alterniflora*; 3 females 15.i.1960 on *Spartina alterniflora* (L. V. Davis) NEW JERSEY, Atlantic Co.,

Oceanville, 6 females, 5 males, 9.viii.1950 (no collector specified); 4 females, 4 males, 31.viii.1959 (no collector specified).

FLORIDA, Wakulla Co., 12.vi.1980 on *Spartina alterniflora*, 6 females, (P. D. Stiling); 8.vi.1980 on *Spartina alterniflora*, 6 females (P. D. Stiling); 8.vi.1980 on *Spartina alterniflora*, 3 females, 1 male (P. D. Stiling). All material deposited in U.S. National Museum collection.

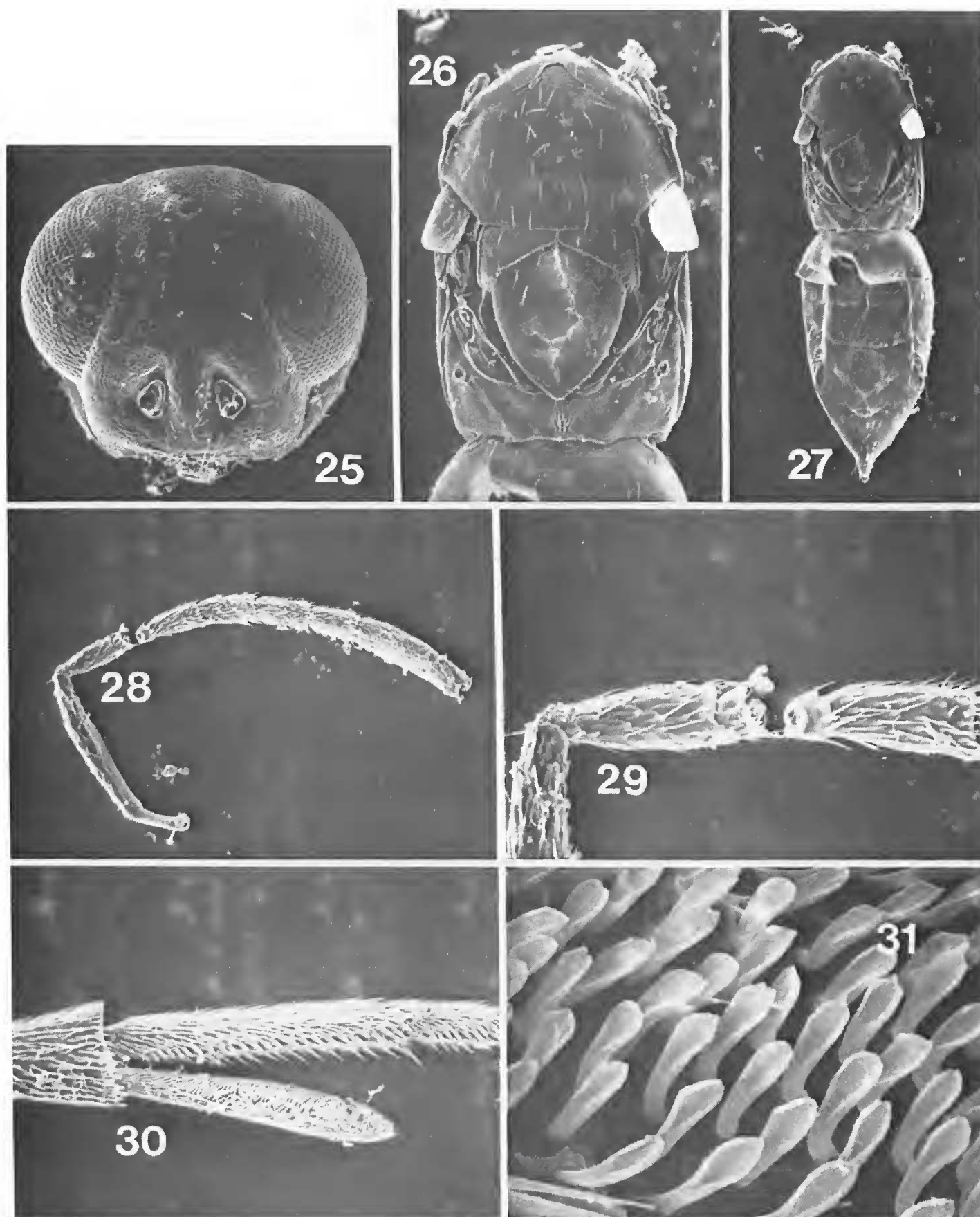
*Meromyzobia melanosoma* most nearly resembles *M. unifasciata* based on the three-toothed mandible, exerted ovipositor and gonostyli; apically lobate middle tibial spur, and seventh sternum which terminates near the basal one-third of the metasoma. The new species differs from *unifasciata* most conspicuously in the elongate metasoma which is clearly longer than the mesosoma, the body coloration, and the forewing with two large fuscous areas separated by a hyaline stripe. The male of *unifasciata* remains unknown, and the species remains known only from the holotype. The species here called *melanosoma* appears widespread in Atlantic Coastal situations and taken frequently with the salt marsh grass *Spartina alterniflora*. The holotype and other specimens taken by P. D. Stiling were reared from fly puparia (Stiling numbers 628C, 628D).

#### *Meromyzobia pedicelata*, NEW SPECIES

*Female*.—2.30 mm long. Head predominantly pale brown; intertorular projection, clypeus tan. Anterior face of pronotum reddish brown, posterior one-third tan; mesoscutum predominantly brown; region posteriad of parapsidal sutures tan. Axilla, scutellum, propodeum dark reddish brown; anterior half of tegula nearly white, posterior half dark reddish brown; mesopleuron pale brown. Anterior half of first metasomal tergum yellow, posterior half of first and second through sixth terga reddish brown; posterior margin of fifth and sixth terga nearly black, each forming a conspicuous "V." Basal terga pale yellow; distal portion of seventh sternum brown. Antenna tan. Coxae and trochanters yellow or nearly so; fore and middle femora tan; hind femur dark brown or nearly black; fore and middle tibiae dusky; hind tibia with basal one-third tan, distal two-thirds concolorous with hind femur; middle tibial spur yellow; tarsomeres dusky with pretarsi somewhat darker in certain plays of light. Forewing hyaline with a large fuscous cloud posteriad of marginal and stigmal veins which expands toward remigium and which is interrupted by a pale, transverse line corresponding roughly to a cubital vein; hind wing hyaline. Gonostyli white or nearly so.

Head in dorsal aspect with frontovertex 0.50 times as wide as head; head in frontal aspect (Fig. 25) minute and weakly reticulate with several scattered, shallow, setigerous punctures; lateral ocellus less than one diameter from medial margin of compound eye; posterior-most margin of compound eye less than one ocellar diameter from vertexal margin. Antenna as illustrated (Figs. 28, 29). Mandible with one tooth and a broad truncation.

Pronotum about 0.33 times as long as medial length of mesoscutum. Mesoscutum weakly and uniformly reticulate (Fig. 26), nearly polished; sculptural pattern nearly identical on axillae and scutellum. Scutellum as long as wide, rather robust. Mesopleuron polished with very weak reticulate sculpture along anterior margin, 1.7 times longer than wide. Propodeum with a complete, well developed, longitudinal median carina; subcuticular carinae parallel. Middle tibial spur slightly longer than

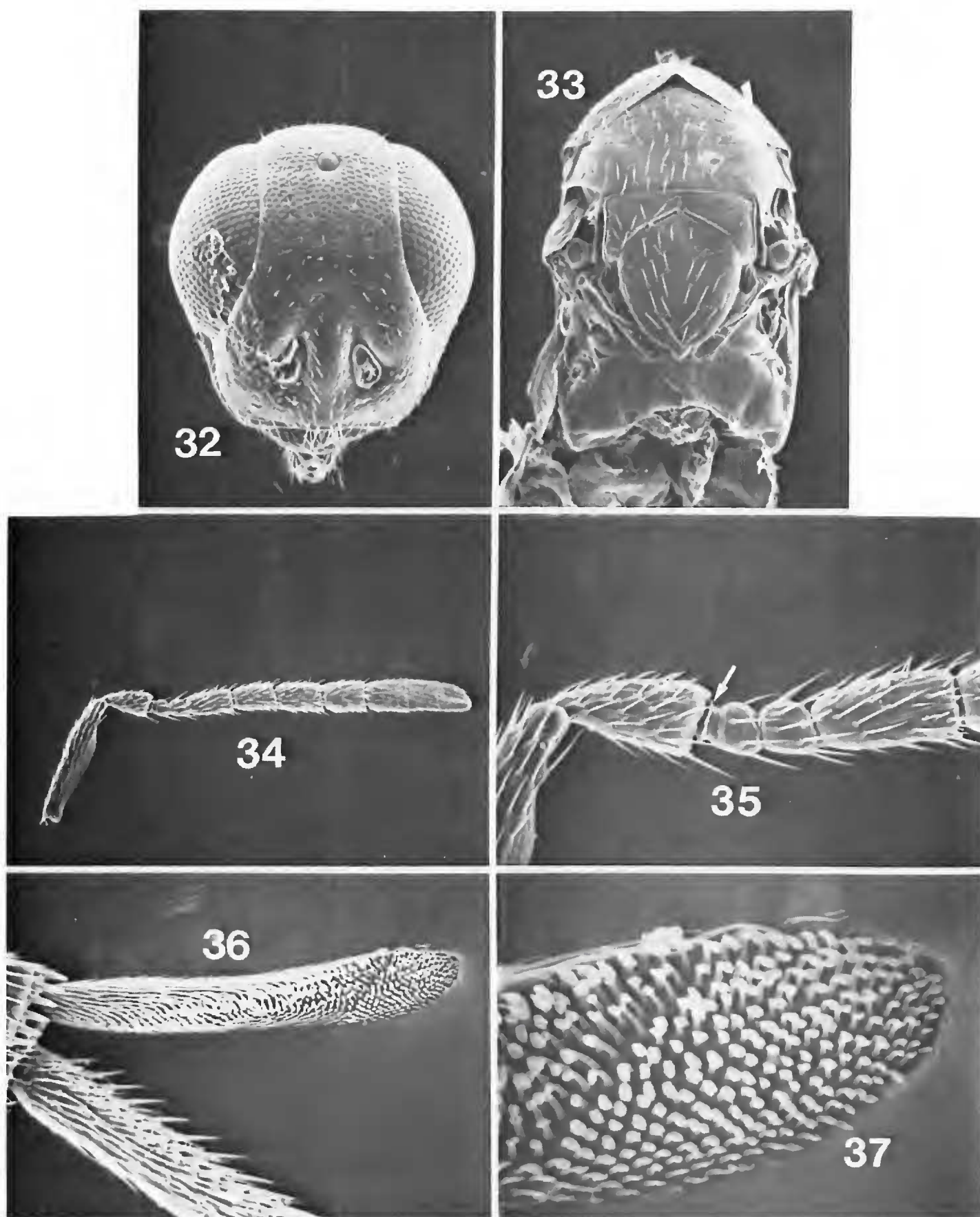


Figures 25–31. 25. *M. pedicelata* NEW SPECIES. Female head, frontal aspect. 26. *M. pedicelata*, female mesosoma. 27. *M. pedicelata*, female mesosoma and metasoma. 28. *M. pedicelata*, female antenna, medial aspect. 29. *M. pedicelata*, female pedicel, Funicular I–III. 30. *M. pedicelata*, female middle tibial spur and basitarsus, medial aspect. 31. *M. pedicelata*, female middle tibial spur setae on medial surface.

basitarsus; distally lobate (Figs. 30, 31); setae on medial surface moderately long, curved, with apical tines absent or very weakly developed.

Metasoma (Fig. 27) about as long as mesosoma; ovipositor and gonostyli very weakly exerted.

Metasoma 1.33 times as long as mesosoma. Terga weakly and uniformly reticulate; pygostyli just posteriad of imaginary line bisecting metasoma. Seventh

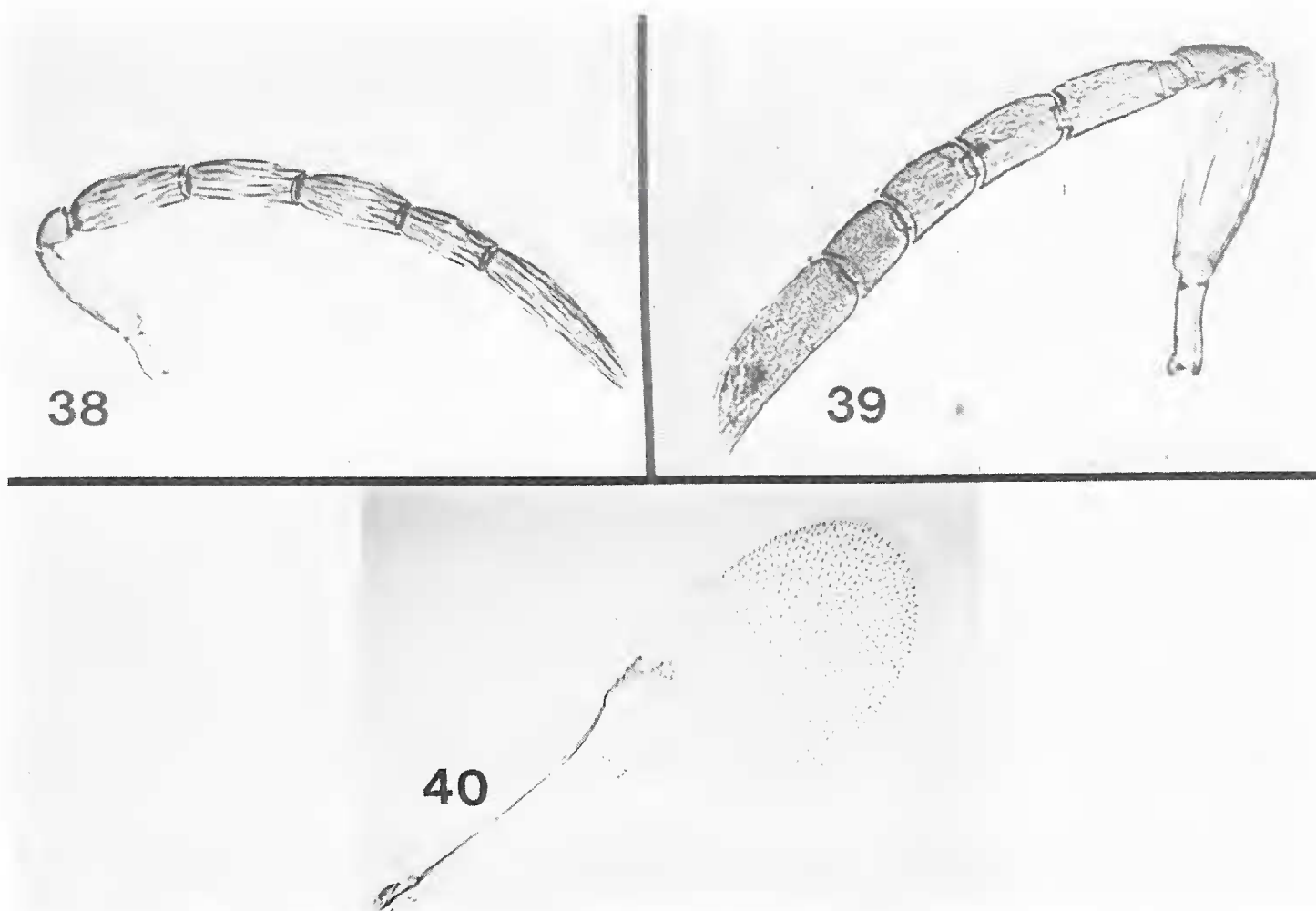


Figures 32–37. 32. *M. texana* NEW SPECIES. Female head, frontal aspect. 33. *M. texana*, female mesosoma (arrow to parapsidal suture). 34. *M. texana*, female antenna, lateral aspect. 35. *M. texana*, female antenna, annelus (arrow), Funicular I–III. 36. *M. texana*, female middle tibial spur, medial aspect. 37. *M. texana*, female middle tibial spur setae on medial surface.

sternum near imaginary line bisecting metasoma; posterior margin transverse. Ovipositor and gonostyli visible when specimen viewed in lateral aspect, but not exerted beyond apex of metasoma.

*Male*:—Unknown.

Described from six females reared from Orthoptera eggs attached to *Tripsacum laxum* Nash taken at Kicco, Florida, on 3 February 1932 by R. D. Kennedy. This



Figures 38–40. 38. *M. deserticola* NEW SPECIES. Male antenna, medial aspect. 39. *M. deserticola*, female antenna, medial aspect. 40. *M. deserticola*, male forewing.

plant is native to Central America and not common in the United States. Holotype and paratypes card-point mounted and deposited in the USNM collection. One paratype dissected and mounted on a microscope slide.

This species appears related to the type-species, *M. maculipennis*, and *M. bifasciata*, based on the large, robust body, forewing coloration and venation, mandible with one tooth and a broad truncation, and large, distally enlarged, middle tibial spur. It may be distinguished from those species based on the elongate pedicel, distinctive medial propodeal carina, and the host association. According to Dr. D. Nickle (pers. comm.), the host was probably a tettigoniid. The host association appears solid. Preserved with the type-series are the eggs from which the parasites emerged that contain the pupal exuviae of the parasites. Other species of *Meromyzobia* for which the biology is known develop within fly puparia.

#### *Meromyzobia texana*, NEW SPECIES

*Female*. —2.05 mm long. Body predominantly lemon yellow with following areas darker: anterior face and postero-lateral margin of pronotum, posterior half of tegula; metanotum, propodeum reddish brown; fourth metasomal tergum forming a broad, transverse dark brown dusky stripe; fifth tergum dusky, metasoma with a dusky spot on either side of apex. Antenna dusky. Forewing predominantly hyaline with infuscation distad of speculum and beneath marginal vein and expanding toward remigium, interrupted by a hyaline, transverse stripe at region of imaginary cubital vein; distal margin with an occasional darkened area. Coxae, fore and middle

femora, all tibiae yellow; basal half of hind femur and tibia pale, distal half dusky to dark brown; middle tibial spur white, tarsomeres off-white; apices of pretarsi dusky.

Head in dorsal aspect with frontovertex 0.41 times as wide as head; surface minutely reticulate with several shallow setigerous punctures; lateral ocellus separated from medial margin of compound eye by about one ocellar diameter; posterior margin of compound eye nearly confluent with posterior margin of head, separated by less than ocellar diameter. Head in frontal aspect (Fig. 32) as wide as tall; toruli just beneath imaginary transverse line extending between ventral margins of compound eyes. Toruli short and shallow. Clypeal margin transverse. Antenna as illustrated (Figs. 34, 35). Mandible tridentate.

Mesosoma (Fig. 33) with pronotum 0.30 times as long as mesoscutum; posterior margin broadly indented; surface weakly reticulate with moderate vestiture of dark setae. Mesoscutum with similar sculpture and vestiture of setae; parapsidal sutures transverse but not meeting mesad. Scutellum as long as wide, moderately robust. Middle tibial spur (Figs. 36, 37) as long as middle basitarsus; lobate distad. Setae on medial surface long and apically clubbed. Propodeum with subcuticular longitudinal carinae divergent posteriad, medially bearing a very weak, incomplete superficial carina.

Metasoma 1.25 times as long as mesosoma. Gonostyli very slightly exerted. Seventh sternum apically transverse, along with pygostyli just anterior of an imaginary line bisecting metasoma.

*Male*.—1.76 mm long. Apical half of metasoma dusky, otherwise identical to female in habitus, chaetotaxy and coloration.

Described from seven females and one male taken at Weslaco, Texas, on 15/II/1949 by P. T. Rihard from rhodesgrass infested with *A. graminis*, and two females taken by the same collector on *Chloris gayana* Kunth infested with *A. graminis* at the same locality on 14/I/1947. Material deposited in the USNM collection. All specimens card-point mounted except one female which is slide mounted.

#### DISCUSSION

Placement of this species is difficult. I have run it out among the smaller species in the genus because I believe that is where its affinities lie. This being despite the fact that *M. texana* is macropterous while *M. deserticola* and *M. flavicincta* are micropterous as females. Perhaps more meaningful in distinguishing *texana* from these two species is the curious directly convergent nature of the parapsidal sutures, a feature not seen in other *Meromyzobia*. An incipient medial propodeal carina suggests it may be related to *M. pedicelata*, but that species has mandibles with one tooth and a broad truncation. I no longer doubt that rhodesgrass scale could be a host of this parasite, but I have not seen it from other collections of this parasite taken from rhodesgrass scale in Texas. If *texana* is a parasite of *graminis*, the parasite shifted from a native host or was originally from the Orient, the natural range of *graminis*. The suggested host range of *Meromyzobia* is too broad to rule out any possibility for the origin of *texana* at this time. Curiously, *A. graminis* has been well studied in Texas and has other imported encyrtid parasites (Clausen, 1978), including other Miraini and mealybug parasites. *Meromyzobia* has not been reported from the Orient (Noyes and Hayat, 1984). Given very limited data, I suspect *texana* is probably attacking Diptera puparia in grasses, and that the species is native to North America.

*Meromyzobia unifasciata* (Ashmead), 1900. Proc. U.S. Natl. Mus. 22:350. Female.

This species was based on one female taken at Utica, Mississippi, and has not been recovered subsequently. The holotype is point mounted and stands in the USNM collection (#4724). The original description is generally accurate, but relies exclusively on coloration. More important diagnostic characters useful in identifying this species include the distally lobate middle tibial spur, conspicuously exerted ovipositor and gonostyli, parallel, subexocuticular, longitudinal propodeal carinae, frontovertex 0.72 times as wide as head is long and 0.39 times as wide as head. Mandible tridentate. Macropterous, forewing weakly infumated beneath marginal vein. Metasoma, excluding exerted gonostyli, as long as mesosoma. Coloration faded, but taken as generally accurate in the original description.

Scutellum with median length 1.18 times maximal width. Mesopleuron weakly reticulate with pattern fading posteriad and absent along posterodorsal margin.

Metasoma, excluding exerted portion of gonostyli, 0.89 times as long as mesosoma. Fuscous cloud beneath marginal and stigmal veins of forewing not projecting to posterior margin of wing.

The male remains unknown.

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